

Teawon Han | Curriculum Vitae

☎ +1 614 736 9476 • ✉ han.394@osu.edu • 🌐 www.hantw.com

Education

Academic Qualifications.....

- **Ohio State University** **Columbus, OH, United States**
Ph.D., Electrical and Computer Engineering, Research Assistant
August 2017– Dec. 2020 (expected)
 - Advisor: Prof. Umit Ozguner
 - Evolving Intelligent Control System for Automated Vehicle Controls
- **Ohio State University** **Columbus, OH, United States**
Master of Science, Electrical and Computer Engineering
August 2017– Dec. 2019
 - Advisor: Prof. Umit Ozguner
 - Driver's Intention Recognition and Behavior Prediction
- **University of Southern California (USC)** **Los Angeles, CA, United States**
Master of Science, Computer Science
August 2010–May 2012
 - Advisor: Prof. Paul Rosenbloom and Prof. Wei-Min Shen
 - Artificial Intelligence and Robotics
- **Hallym University** **Chuncheon-si, Gangwon-do, South Korea**
Bachelor of Engineering, Computer Engineering
March 2002–February 2006
 - Advisor: Prof. Young-Woong Ko
 - Embedded System

Research Experiences in Academic Projects.....

- **Controls and Intelligent Transportation Research Lab** **Center for Automotive Research, OSU**
Graduate Research Associate
August 2017–Current
 - Advisor: Professor Umit Ozguner
 - Developed an online evolving method which makes optimal decisions under unexpected situations via own or shared experiences.
 - Studying an online evolving framework to obtain an optimal driving policy in an iterative manner for Automated Vehicle (AV).
 - The study is funded by the Ford Motor Company's University Research Program (August 2019 - March 2020)
 - The research project (2 years) is organized by OSU and the Ford Motor Company based on the preliminary results and ongoing (March 2020 - March 2022).
 - Publication1: Driving Intention Recognition and Lane Change Prediction on the Highway, IV 2019
 - Publication2: An Online Evolving Framework for Advancing Reinforcement-Learning based Automated Vehicle Control, IFAC 2020 21th World Congress (Accepted)
 - Posted Paper: An Online Evolving Framework for Modeling the Safe Autonomous Vehicle Control System via Online Recognition of Latent Risks, arXiv preprint arXiv:1908.10823
- **Polymorphic Robotics Laboratory** **Information Sciences Institute (ISI) of USC**
Directed Research Student
January 2012–July 2012
 - Advisor: Professor Wei-Min Shen
 - Researched and developed an optimal algorithm that makes a reconfigurable robot (called SuperBot) to choose the best shape and gait autonomously based on different environments [\[link\]](#).
 - Publication: An online gait adaptation with SuperBot in sloped terrain, ROBIO 2012
- **Cognitive Architecture Lab** **Institute for Creative Technologies (ICT) of USC**
Directed Research Student
May 2011–January 2012

- Advisor: Professor Paul S. Rosenbloom
- Contributed to improve the Graphical Cognitive Architecture (GCA)'s learning and reasoning systems.
- Developed a logical GCA structure for mobile robot's localization and navigation.
- Publications:
 - Fusing Symbolic and Decision-Theoretic Problem Solving+Perception in a Graphical Cognitive Architecture, BICA 2011.
 - Learning via gradient descent in Sigma, ICCM 2013.

Computational Neuro-Rehabilitation & Learning Lab

USC

Directed Research Student

January 2011–May 2011

- Advisor: Professor Scheweighofer Nicolas
- Researched and developed the learning and reasoning system to improve efficiency of rehabilitation processes.
- Developed an intelligent system by using the Bayesian Logistic Regression model, which can recognize and predict patient's current and future rehabilitation statuses.

Previous Employment

Robot Development Group, New Business Division,

HANWHA AEROSPACE

Research Engineer

July 2015–May 2017

Hanwha Group acquired Samsung Techwin to expand their defense & security business. Indeed, Hanwha Group became the top ranked defense company in South Korea.

- Project: Unmanned Aerial Vehicle (UAV) Autonomous Flight System
 - Researched a framework of UAV control system for cognition of environmental conditions and optimal controls given missions (e.g., searching and tracking target objects, creating an aerial map).
 - Designed the system configuration for UAV's autonomous flight (using Pixhawk and Raspberry Pi).
 - Developed a system to create an aerial map by using UAV and a single camera.
 - Demonstration of prototype UAV control system [\[link\]](#)

Robot Technology Group, Advanced Technology Institute

SAMSUNG TECHWIN

Research Engineer (Unmanned Autonomous Driving System Team)

August 2012–June 2015

- Project: Autonomous Driving Car (platform: QM5 made by Renault Samsung Motors)
 - Developed lane and curb detection systems: the Artificial Neural Networks is trained to detect *lane features* under various conditions (camera and laser sensors are used for collecting data).
 - Developed the localization system which can revise GPS positions in real time by detecting sensor's errors.
 - The errors are measured by analyzing detected lanes and given map.
 - Publications:
 - Lane detection & localization for UGV in urban environment, ITSC 2014
 - Demonstrated by using developed autonomous driving car [\[link\]](#)
 - A New Quadtree Data Structure for Mobile Robot Mapping Problem in a Large Scale Area, ICROS 2013
- Project: Off-Road Unmanned Ground Vehicle (UGV) [\[link\]](#) for surveillance and reconnaissance operations.
 - Developed the object detection system and the traversability mapper by using 3D LIDAR and IMU sensors.
 - [Demonstration 1 \[link\]](#), [Demonstration 2 \[link\]](#)
- Project: Indoor UGV for factory automation
 - Developed the indoor localization system which recognizes accurate positions without GPS by using stereo camera. (Advanced version), [Demonstration \[link\]](#)
 - Developed a line-tracing system by using a single camera (Standard version), [Demonstration \[link\]](#)
- Patents
 - Device and method for correcting vehicle position, system for correcting vehicle position by using lane and vehicle capable of manless operation (PCT/KR2014/004299).
 - Lane detection system and method (US 9245188 B2).
- Other Experiences
 - Developed device drivers for sensors under the necessity using Serial and Ethernet protocols.
 - Development Environment: ROS and C++ on Linux

- Sensors: GPS/INS (Span-CPT, VN-200), camera (Flea), laser sensor (LMS-151, LMS-511, LD-MRS), LIDAR (Velodyne 64E, 16), Kinect, Tigereyes
- Designed and created robot's mechanism parts by using Solidworks and 3D printer.

Other Experiences

- **65Div. 186R 2BN** **The Republic of Korea Army**
First Lieutenant, Secure Information Officer and Platoon Leader *March 2006–June 2008*
 - Led and counseled 40 soldiers for training combat-strategies and executing missions.
 - Operated the "military tactic-command and information system".
 - Managed confidential documents.
- **Reserved Officers' Training Corps (ROTC)** **Hallym University**
Staff member of cadets *March 2005–Nov. 2005*
 - Managed and counseled 24 cadets in military classes and training.
 - Prepared military training and made an annual plan.

Publications

- Han, T., Filev, D., & Ozguner, U. (2020). An Online Evolving Framework for Advancing Reinforcement-Learning based Automated Vehicle Control. 21st International Federation of Automatic Control World Congress (Accepted).
- Han, T., Filev, D., & Ozguner, U. (2019). An Online Evolving Framework for Modeling the Safe Autonomous Vehicle Control System via Online Recognition of Latent Risks. arXiv preprint arXiv:1908.10823.
- Han, T., Jing, J., & Özgüner, Ü. (2019, June). Driving Intention Recognition and Lane Change Prediction on the Highway. In 2019 IEEE Intelligent Vehicles Symposium (IV) (pp. 957-962). IEEE.
- Han, T., Kim, Y., & Kim, K. (2014, October). "Lane detection & localization for UGV in urban environment". In 17th International IEEE Conference on Intelligent Transportation Systems (ITSC) (pp. 590-596). IEEE.
- Kim, D., & Han, T. (2013). "A New Quadtree Data Structure for Mobile Robot Mapping Problem in a Large Scale Area". Institute of Control, Robotics, and System 2013, 294-295.
- Rosenbloom, P. S., Demske, A., Han, T. & Ustun, V. (2013). "Learning via gradient descent in Sigma". In Proceedings of the 12th International Conference on Cognitive Modeling (Vol. 94).
- Han, T., Ranasinghe, N., Barrios, L., & Shen, W. M. (2012, December). "An online gait adaptation with superbot in sloped terrains". In 2012 IEEE International Conference on Robotics and Biomimetics (ROBIO) (pp. 1256-1261). IEEE.
- Chen, J., Demske, A., Han, T., Morency, L. P., Pynadath, D. V., Rafidi, N., & Rosenbloom, P. S. (2011, October). "Fusing Symbolic and Decision-Theoretic Problem Solving+ Perception in a Graphical Cognitive Architecture". In BICA (pp. 64-72).

Technical and Personal skills

- **Programming Languages:**
 - Proficient in: C, PHP, C++, Matlab, Python, Tensorflow, TeX, ROS, OpenAI Gym, Sumo.
- **Industry Software Skills:** SolidWorks (Advanced), Most Microsoft Office products (Advanced).
- **General Business Skills:** Good presentation skills, Works well within a team.
- **Interests:**
 - Artificial Intelligence, Machine Learning, Robotics, Computer Vision, Multi-agents System (Intelligent Collaboration), Unmanned Ground/Aerial Vehicle System.